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ANDROSCOGGIN RIVER STUDIES

EIGHTEENTH

ANNUAL REPORT

1960

by

Walter A. Lawrance

Lewiston, Maine
November, 1960

EIGHTEENTH

ANNUAL REPORT

1960

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ANDROSCOGGIN RIVER

ODOR REPORT

LEWISTON-AUBURN AREA

1960

Lewiston, Maine
November, 1960

SUMMARY

1. Odor Conditions. River odor intensities in the Lewiston area were the lowest since systematic observations were begun. They were so low that objectionable odor may be considered as having been non-existent. The concentration of hydrogen sulphide in the air at the Dams was very low and frequently absent. For the first time in at least twenty years there was no "general" odor coverage.

2. Thermal Conditions. With the exception of July, air temperatures were somewhat higher than the longrange averages. During July and August, water temperatures were unusually steady; there were no high peaks.

3. Precipitation and River Flows. June through August, precipitation was below average. However, owing to good storage conditions, river flows were above the twenty-three year average, July through September.

4. Surface Conditions. South of Deer Rips, surface conditions usually were very good and seldom had objectionable foam masses.

5. Pollution Factors. The control period's average pollution factor was 0.49, probably the lowest for any comparable period since the three companies began operating simultaneously along the river. The Decree minimum is 1.75.

6. Control Period. Control was initiated on June 15 and continued until September 26.

FINAL REPORT on the ANDROSCOGGIN RIVER ODOR

in the

LEWISTON-AUBURN AREA

1960

Introduction. Determination of the intensity and type of the Androscoggin River odor in the Lewiston-Auburn area was begun on June ten and completed September thirty. Daily reports were sent to all parties concerned at frequent intervals. They are numbered one to one hundred and thirteen.

Water temperatures were above the eighteen year average during June but were slightly below the long range average July through September. River flows were above the twenty-three year average (1938-1960) during July, August and September. Pollution factors were low and river odor intensities were the lowest since records were begun in 1943. For the first time since the surveys were started there was no "general" odor coverage reported.

The arrangement of this report, odor terms and calculation of odor intensities are essentially the same as those employed in the previous seventeen reports.

Daily Report Data. The daily reports contain a record of

a. Air temperatures
b. General weather conditions
c. Direction of the wind
d. Water passing over the Lewiston Falls
e. Surface appearance of the water
f. Types of odor originating in the river water
g. Atmospheric intensities of the river odor
h. Conditions at Gulf Island and Deer Rips Dams (occasionally)

This report contains tabulations and summaries of the daily data and comparisons with certain other years.

Odor Observation Stations. The locations of the odor observation stations were the same as those chosen in 1943 and used in each successive year.

Air Temperatures. The air temperatures recorded in the daily reports was that prevailing at station six at the commencement of the observations. Due to difference in location there may be a difference of one or two degrees, plus or minus, from the temperature recorded at the official weather station.

The Weather Bureau Hourly Mean Temperatures for June through September and the seventy-six year averages are listed in Table #1.

TABLE #1

Mean Hourly Air Temperatures (F.)

Year	June	July	August	September
1960	64.61	68.15	67.97	59.66
1959	59.56	70.83	69.11	61.64
1958	59.13	67.52	67.15	59.37
76 year average	63.14	68.93	66.74	59.22
Deviation from average	+1.47	-0.78	+1.23	+0.44

Long range data were listed in the 1955 report.

June was about five degrees warmer than that recorded for the same month in 1959 and 1958. July was slightly cooler than the long range average but August and September were warmer than the average.

Precipitation. The summer season began with satisfactory amounts of water in storage but precipitation during June, July and August was less than the long range averages. Hurricane Donna contributed to the September precipitation of 4.41 inches. Precipitation data for Lewiston are recorded in Table #2.

TABLE #2

Precipitation (Inches) Lewiston

Year	June	July	August	September
1960	2.21	3.10	1.59	4.41
1959	5.27	1.27	2.72	2.27
1958	2.18	3.57	2.19	2.69
86 year average	3.39	3.51	3.06	3.55
Deviation from average	-1.18	-0.41	-1.47	+0.86

Direction of the Wind. During the time of the odor observations the direction of the air flow, days per season, were:

North	16	South-West	5
North-N.West	24	South-East	2
North-West	22	West	2
North-N.East	2	East	1
South	19	Variable	4
South-S.West	6		

Southerly winds were less frequent than during 1959.

Water Flowing Over the Lewiston Falls. The intensity of the river odor is always increased when river water is permitted to flow over the Falls or through the Canal by-pass gates. During the summer, water is passed over the Falls during the extended mill shut-downs especially in the long holiday period of one to two week including July fourth.

"Depth" Color of River Water. For the first time since records were made the usual brownish "depth" color of the river water did not change to "blackish". In 1959 the "blackish" color appeared for about five weeks and returned to brownish about mid-September; 1959 was the first year that this reversal occurred during the control season.

River Surface Conditions. Foam, film and scum were less frequent and occupied smaller areas than in previous years. South of Lewiston Falls, foam conditions are now influenced more by the detergents discharged from the local mills.

Floating sludge has not been observed south of Gulf Island since 1944. Much floating sludge was visible during June and July north of mile three in the Androscoggin Pool but very little during the remainder of the season. However, on September sixteen an enormous mass of sludge, about one mile in length was observed passing from above Turner Center Bridge to the southern section of the Pool. On September forteen the peak flow approximated twenty thousand c.f.s.

The area of film coverage in the Pool was small compared with previous years. There were many days of rough water over large areas of the Pool.

Blue-Green Algae and Vorticella. Blue-green algae in observable amounts were almost absent this season. For the third successive season the whitish, Vorticella-Zoogleal masses were not reported as present just below Gulf Island Dam.

Odor Intensities. River odor intensities averages were the lowest recorded since systematic daily observations were begun in 1943. This year the river odor intensity was so low that it may be classified as insignificant. In the down-town areas the odor was seldom noticed a few feet from the canal or river bridges and was so slight that an inexperienced observer probably would not notice it and if he did, probably would consider it as "watery". For the first time since 1943 there was:

a. no general odor coverage
b. no complaints about odor made to the Administrator
c. considerable favorable comment about the absence of objectionable river odor

Hydrogen sulphide was not observed in the down-town areas nor found in the river water sampled from the Canal. This odor was frequently present in trace amounts at Gulf Island Dam just above the tailrace. It was seldom present at Deer Rips Dam.

The average weekly intensity numbers for classifying the odor experience of the past eighteen years indicate, in order of decreasing odor intensity, the years as, 1944, 1943, 1947, 1946, 1945, 1948, 1952, 1949, 1951, 1956, 1957, 1950, 1953, 1955, 1954, 1958, 1959 and 1960.

The 1960 data are recorded in Tables #3 and #3A. They are placed here for the purposes of comparison, the numbers are so low as to be insignificant as to odor but very significant when compared to, say, those of 1944.

TABLE #3

Odor Intensity Frequencies 1960, 1959, 1944

Days Per Month

	#1			#2			#3			#4			#5		
	60	59	44	60	59	44	60	59	44	60	59	44	60	59	44
Station #1															
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	3	0	0	2	0	0	1	0	0	0	0	0	0
Aug.	0	0	2	0	0	1	0	0	5	0	0	0	0	0	0
Sept.	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Station #2															
June	3	9	8	0	0	11	0	0	3	0	0	0	0	0	0
July	5	18	12	0	0	10	0	0	7	0	0	5	0	0	0
Aug.	10	14	0	0	0	11	0	0	17	0	0	9	0	0	0
Sept.	8	11	5	0	0	18	0	0	5	0	0	0	0	0	0
Station #3															
June	9	14	2	4	6	14	0	2	7	0	0	0	0	0	0
July	17	24	5	1	3	10	0	0	12	0	0	7	0	0	1
Aug.	12	19	0	0	0	8	0	0	21	0	0	11	0	0	0
Sept.	4	17	3	1	0	18	0	0	12	0	0	0	0	0	0
Station #4															
June	1	13	4	0	1	13	0	0	5	0	0	5	0	0	0
July	8	16	11	0	0	9	0	0	8	0	0	19	0	0	0
Aug.	12	14	0	0	0	1	0	0	19	0	0	4	0	0	0
Sept.	4	12	5	0	0	12	0	0	14	0	0	0	0	0	0
Station #5															
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	4	0	0	3	0	0	1	0	0	0	0	0	0
Aug.	0	0	1	0	0	10	0	0	3	0	0	0	0	0	0
Sept.	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0
Station #6															
June	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	4	0	0	2	0	0	2	0	0	0
Aug.	0	0	0	0	0	5	0	0	12	0	0	10	0	0	2
Sept.	0	0	0	0	0	4	0	0	8	0	0	0	0	0	0
Station #7															
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Aug.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station #8															
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Aug.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

The maximum weekly average intensity number is, perhaps, a better bases for comparison. The yearly order is then, 1944, 1947, 1945, 1943, 1946, 1948, 1957, 1952, 1951, 1950, 1953, 1955, 1956, 1949, 1954, 1958, 1959 and 1960.

TABLE #3A

Comparison of Odor Intensity Numbers

	1960	1959	1958	1957	1944
Total Intensity Numbers	105	202	232	364	813
Number of Weeks	16	16	15	17	16
Average Weekly Intensity Number	7	13	16	22	51
Maximum Weekly Intensity Number	10	22	22	43	79
Maximum Odor Downtown During Week Ending	4 weeks	6/18	7/10	6/27	8/3

General Odor Coverage. General odor coverage is recorded when the river odor is noticeable at station six. There was no general odor coverage this year; table #4 records this fact. Table #5 enables comparison to be made with certain previous years.

TABLE #4

General Odor Coverage

1960

Date	Highest Intensity	Type	Time Period
NONE			

TABLE #5

General Odor Coverage

Station #6

Days per Month

	1960	1959	1958	1957	1944
June	0	1	0	2	0
July	0	0	3	3	5
August	0	0	0	0	15
September	0	0	0	0	8
Total Days	0	1	3	5	28

Odor Types.

Pig Pen. For the third consecutive year this odor was not recorded at the downtown Lewiston and Auburn stations. However, this odor was frequently present north of mile two in the Pool especially during June and July, and originated in the sludge.

Hydrogen Sulphide. Hydrogen sulphide was not recorded at any of the downtown odor observation stations. The concentration in the lower water stratas at Gulf Island Dam usually was very low, often zero, and the sulphide was oxidized after passing through wheels into the tailrace.

The concentration in the air at Gulf Island Dam generally, was such that the odor seldom was detected at short distances from the dam. The situation at Deer Rips Dam was better than that at Gulf Island.

Paint discoloration was not observed by, or reported to the Administrator.

Simular to last year, hydrogen sulphide appears in the Pool in "pockets" near and on the bed and seem to move with minor diffusion down to the Dam.

TABLE #6

Frequency of Recorded Odor Types

Days per Month

Type of Odor.	June 1960	June 1959	June 1958	June 1944	July 1960	July 1959	July 1958	July 1944
Pig-pen	0	0	0	17	0	0	0	26
Hydrogen Sulphide	0	0	0	2	0	0	0	14
Mouldy	0	5	0	4	0	0	10	0
Musty	12	17	14	11	23	29	24	2
Sulphite	0	0	0	0	0	0	0	0
Fishy	0	0	0	0	0	0	0	0
Sour	0	0	0	0	0	0	0	1
Earthy	0	1	3	0	0	3	7	0

Type of Odor.	August 1960	August 1959	August 1958	August 1944	September 1960	September 1959	September 1958	September 1944
Pig-pen	0	0	0	30	0	0	0	22
Hydrogen Sulphide	0	0	0	30	0	0	0	15
Mouldy	0	2	0	9	0	0	0	10
Musty	26	20	27	3	13	19	21	4
Sulphite	0	0	0	3	0	0	0	0
Fishy	0	0	0	0	0	0	0	7
Sour	0	0	0	0	0	0	0	0
Earthy	5	5	6	0	3	4	2	0

TOTALS

Type of Odor.	1960	~~1959~~ 1959	~~1958~~ 1958	~~1957~~ 1957	1944
Pig-pen	0	0	0	0	95
Hydrogen Sulphide	0	0	0	0	61
Mouldy	0	0	7	10	23
Musty	74	74	85	86	20
Sulphite	0	0	0	0	3
Fishy	0	0	0	0	7
Sour	0	0	0	0	1
Earthy	8	8	13	18	0

Musty. During 1960 this was the dominant odor South of Deer Rips Dam and the only pollution odor recorded as present at the Lewiston and canal bridges.

Earthy. This odor is present at the South Bridge only when reduced flow is maintained, usually on Saturday and/or Sunday, and large areas of the river bed are exposed.

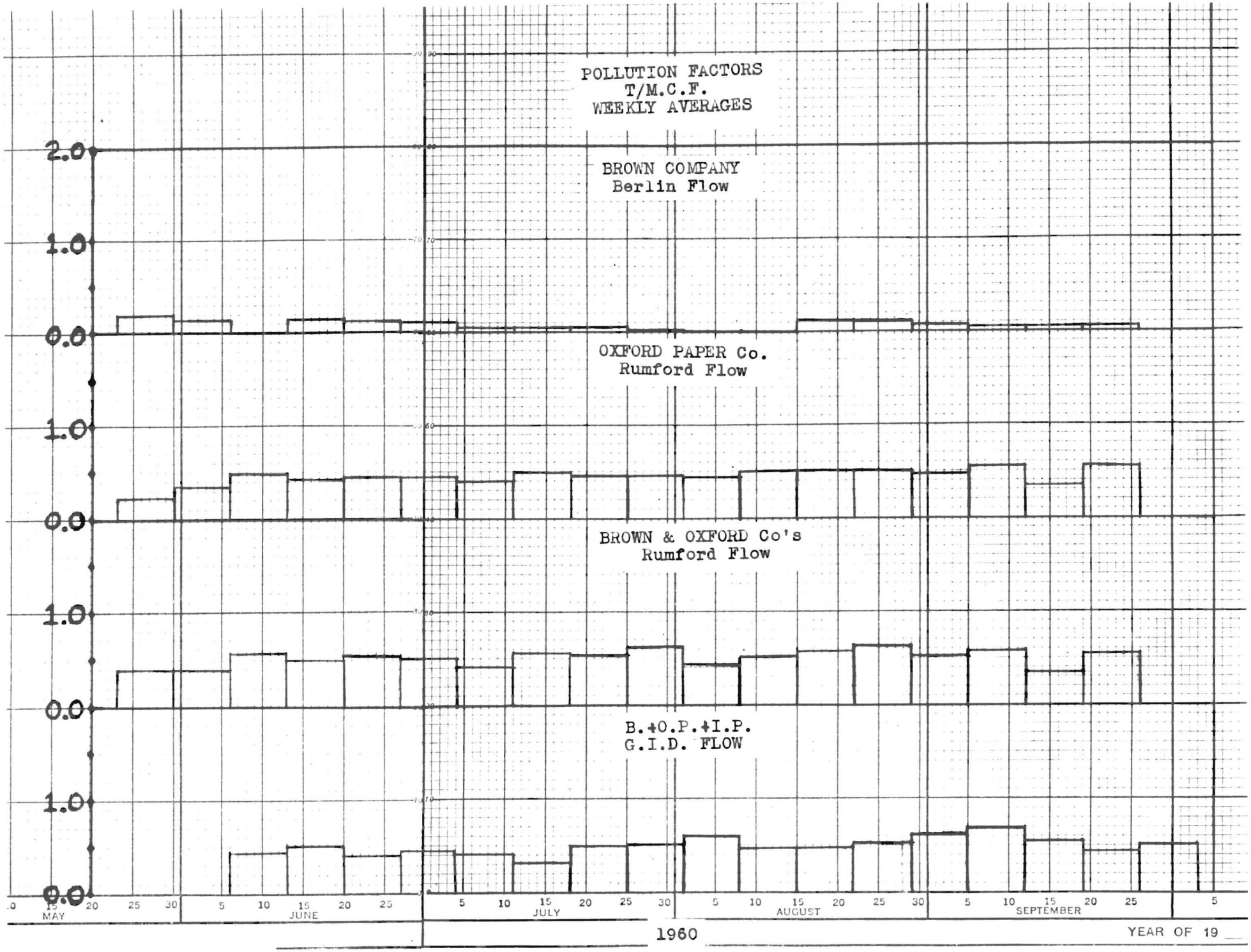
Pollution Load Factors. Owing to somewhat above average river flows and smaller sulphite waste liquor discharge by Brown Company, the pollution load factors were the lowest since 1943. The cumulative effects of the year round reduction in sulphite waste liquor discharged to the river by both Brown Company and Oxford Paper Company are resulting in much lower concentrations of hydrogen sulphide and more available dissolved oxygen.

Quotas for the discharge of sulphite waste liquor were based on river flows, temperature of the water and odor conditions.

Table P.L.F. #1 contains the data for the 1960 pollution factors at Berlin, Rumford and Lewiston, respectively.

Brown Company factors are based on Berlin flows and include sulphite liquors discharged directly to the river and a relatively small amount accidently discharged from the lagoon when it was damaged by highway relocation of a road. Seepage from the lagoons was inconsequential.

Rumford guage data were used to determine the Oxford Paper Company factors and the combined Brown and Oxford


POLLUTION FACTORS
T/M.C.F.
WEEKLY AVERAGES
BROWN COMPANY
Berlin Flow
2.0
1.0
0.0
OXFORD PAPER Co.
Rumford Flow
1.0
0.0
BROWN & OXFORD Co's
Rumford Flow
1.0
0.0
B.+O.P.+I.P.
G.I.D. FLOW
1.0
0.0
MAY
JUNE
JULY
AUGUST
SEPTEMBER
1960
YEAR OF 19

10A

P.L.F. #1

Weekly Pollution Factors

1960

Week Ending	Brown Co.	Oxford Paper Company	Brown and Oxford	Brown Co. Oxford Paper I.P. Co.
	Berlin Flow	Rumford Flow		G.I.D. Flow
June 5*	0.16	0.35	0.40	--
12*	0.	0.50	0.57	0.43
19	0.16	0.42	0.50	0.51
26	0.13	0.44	0.55	0.41
July 3	0.11	0.44	0.49	0.43
10	0.05	0.40	0.42	0.41
17	0.05	0.51	0.58	0.31
24	0.06	0.46	0.53	0,50
31	0.09	0.47	0.62	0.51
Aug. 7	0.	0.44	0.44	0.59
14	0.	0.50	0.50	0.48
21	0.12	0.51	0.57	0.47
28	0.11	0.49	0.65	0.52
Sept. 4	0.07	0.48	0.52	0.58
11	0.05	0.55	0.58	0.68
18	0.05	0.33	0.37	0.54
25	0.06	0.52	0.56	0.44
Oct. 2*	--	--	--	0.51

*No control

P.L.F. #1A

Pollution Load Factor

(Season Average at Gulf Island Dam)

Year	Period	P.L.F.
1960	June 15 to Sept. 25	0.49
1959	May 31 to Sept. 27	0.60
1958	June 16 to Sept. 28	0.81
1957	June 10 to Oct. 20	1.33
1956	June 18 to Sept, 30	1.13
1955	June 13 to Oct. 20	1.38
1954	June 14 to Sept. 19	1.00
1953	June 29 to Oct. 11	1.60
1952	June 15 to Sept. 30	1.85
1951	June 18 to Sept. 18	1.75
1950	June 16 to Sept. 17	1.90
1949	June 16 to Sept. 29	1.88*
1948	June 17 to Sept. 30	2.03
1947	June 19 to Oct. 2	2.07
1946	June 13 to Sept. 26	2.38
1945	June 14 to Sept. 27	2.09
1944	June 15 to Sept. 28	2.60
1943	July 1 to Sept. 16	1.90

*Does not include International Paper Company's pollution load.

P.L.F. #2

Sulphite Pulp Equivalent

of

Sulphite Waste Liquor

Discharged to the Androscoggin River

1960

Week Ending 7:00 a.m.	Brown Co. Tons	Oxford Paper Company Tons	International Paper Company Tons
June 20 (5 days)	189.5	560	71.9
27	148.9	711	99.5
July 4	129.6	698	99.7
11	49.0	718	0
18	64.7	720	99.5
25	164.7	637	99.7
Aug. 1	105.8	645	99.7
8	0	647	99.9
15	0	662	99.9
22	146.2	670	99.8
29	133.7	655	99.6
Sept. 5	80.5	602	99.7
12	49.0	653	99.7
19	67.6	758	99.7
26	70.3	746	99.6

pollution load at Rumford. The Gulf Island Dam guage was used to calculate the three company loads at Lewiston. All pollution factors are compensated for time of passage but no allowance was made for the oxidation of wastes during their passage downstream.

In Table P.L.F. #1A is listed the average daily pollution load factors for the summer season of each year since 1943. The 1960 factor at Gulf Island Dam was 0.49, an "all time" low.

Production Data. The finished sulphite pulp equivalent of the waste liquor discharged each week to the river, by each of the three companies during the period of controls, is recorded in Table P.L.F. #2. These figures are copied from the certified reports to the Administrator.

Water Temperatures. At Gulf Island Dam, river water temperatures were one degree higher than the eighteen year average during June but were lower than this long range average during July, August and September.

Contrary to usual trends there was very little change in the temperature of the water during July and August. The plots of the data are unusually "flat". (cf. Tables T.#1 and T.#2)

River Flows. The river flow at Gulf Island Dam during May, July, August and September was above the twenty-three year averages; the June flow was about 300 c.f.s. below the average. The higher flows, of course, produced a somewhat lower pollution factor.

ANDROSCOGGIN RIVER FLOW

C. F. S.

APRIL, 1960

Date	Berlin	Rumford	Gulf Island Dam
1	3617	10460	11290
2	3434	9510	15530
3	3681	8270	14590
4	4987	10510	14900
5	6778	19790	25450
6	6032	15560	33130
7	5135	11110	24370
8	4539	8840	18140
9	4093	7610	15050
10	3687	6790	12890
11	3407	6280	11740
12	3547	6880	11860
13	3831	8600	13680
14	3887	8690	15530
15	5197	11890	14780
16	6512	15830	21050
17	7903	17540	23440
18	9383	21920	25350
19	8829	20370	28210
20	7349	14540	24470
21	6519	11920	19200
22	6520	12360	17070
23	6393	12250	17220
24	6284	11630	16240
25	6618	12740	15980
26	6024	12680	17310
27	4915	10380	16030
28	4035	9160	13670
29	3349	8160	12090
30	3197	7130	10720

ANDROSCOGGIN RIVER FLOW

C. F. S.

MAY, 1960

Date	Berlin	Rumford	Gulf Island Dam
1	3205	6940	9530
2	3078	7270	9170
3	2856	5880	8470
4	2807	6290	1170
5	3324	6670	7550
6	3687	6950	7760
7	4023	7180	7860
8	4077	7450	8060
9	4477	13330	12990
10	6170	19500	24190
11	7791	15510	23360
12	8945	16060	19830
13	9687	20130	22400
14	10489	25810	32020
15	10473	20770	30740
16	10808	20800	26790
17	10017	17700	24660
18	8710	14500	20600
19	7207	12070	17400
20	5746	9830	14110
21	3950	7600	11420
22	3158	5790	9320
23	2740	4670	7660
24	3001	7050	7500
25	3427	14470	14780
26	2948	8740	17910
27	2679	6110	11600
28	2568	4150	9600
29	2584	4050	7590
30	2415	3740	6760
31	2451	3520	5990

ANDROSCOGGIN RIVER FLOW

C. F. S.

JUNE, 1960

Date	Berlin	Rumford	Gulf Island Dam
1	2583	3500	5770
2	2559	3730	6140
3	2456	3620	6370
4	2400	3460	5690
5	2282	3410	6290
6	2242	3190	6070
7	2289	3020	5430
8	2292	3020	4660
9	2216	2900	4350
10	2183	2820	4030
11	2146	2800	3940
12	2104	2660	3790
13	2043	2590	3880
14	2037	2560	3480
15	2386	2380	3690
16	2498	6220	6490
17	2132	3990	8440
18	2332	3450	5990
19	1980	3260	5130
20	1808	2800	4710
21	1911	2480	3860
22	1840	2500	3220
23	1858	2320	3210
24	2085	2480	3110
25	3019	4140	4010
26	2004	4160	5760
27	1929	2800	5250
28	1939	2570	4040
29	1828	2560	3400
30	1978	2420	3270

ANDROSCOGGIN RIVER FLOW

C. F. S.

JULY, 1960

Date	Berlin	Rumford	Gulf Island Dam
1	1982	2760	3330
2	1888	2560	3760
3	1802	2650	3400
4	2208	3630	3660
5	1953	3400	4870
6	1903	4710	4380
7	1823	4540	3820
8	1823	2360	3460
9	1789	2300	3080
10	1844	2220	2900
11	1965	2260	3410
12	1975	2320	3030
13	1977	2430	2810
14	2005	2360	3060
15	1974	2360	2850
16	1943	2300	2750
17	1935	2210	2710
18	1929	2370	2720
19	2105	2390	2990
20	2066	2710	2880
21	1936	2380	3080
22	1943	2230	2720
23	1952	2190	2790
24	1909	2190	2420
25	1998	2160	2570
26	2023	2220	2420
27	2039	2220	2670
28	1988	2280	2460
29	1983	2200	2600
30	2009	2560	2790
31	2036	4830	3480

ANDROSCOGGIN RIVER FLOW

C. F. S.

AUGUST, 1960

Date	Berlin	Rumford	Gulf Island Dam
1	1926	3100	5450
2	1941	2490	3830
3	1970	2370	3040
4	1964	2260	2740
5	1973	2240	2620
6	1932	2370	2650
7	1911	2250	2420
8	1950	2230	2880
9	1923	2250	2580
10	1935	2240	2590
11	1932	2180	2610
12	1948	2210	2520
13	1971	2160	2330
14	1954	2180	2270
15	1962	2180	2540
16	1945	2180	2640
17	1946	2190	2430
18	1978	2120	2550
19	1990	2180	2210
20	2003	2180	2570
21	2027	2240	2240
22	2041	2260	2650
23	2031	2510	2580
24	1949	2350	2740
25	1931	2090	2620
26	1934	2100	2380
27	1943	2080	2290
28	1923	2090	2120
29	1942	2100	2330
30	1963	2120	2320
31	1940	2110	2210

ANDROSCOGGIN RIVER FLOW

C. F. S.

SEPTEMBER, 1960

Date	Berlin	Rumford	C.I. Dam
1	1894	2060	2300
2	1919	2060	2100
3	1861	2080	2210
4	1861	1800	2050
5	1899	2060	1620
6	1862	2320	2400
7	1851	1840	2330
8	1863	1970	2090
9	1856	1950	1910
10	1840	1960	2050
11	1869	1990	2040
12	2902	5190	2530
13	3455	15490	12460
14	2148	6570	15470
15	2111	3800	7550
16	1879	3210	4370
17	1851	2650	3340
18	1874	2170	3020
19	1822	2400	2850
20	1885	2400	2680
21	1870	2660	2810
22	1897	2460	3160
23	1869	2410	2910
24	1828	2280	2650
25	1868	2230	2520
26	1850	2250	2570
27	1839	2160	2500
28	1833	2190	2420
29	1842	2160	2520
30	1904	2240	2500

TABLE A.D.F. #1

Average Daily Flows

C. F. S.

Gulf Island Dam

Year	May	June	July	August	Sept.	J.A.S. Aver.
1960	14348	4782	3093	2637	3464	3065
1959	4115	5941	3230	2707	3212	3050
1958	12390	3966	3105	2785	2751	2880
1957	4567	2540	2342	2129	1956	2132
1956	11360	4945	3310	2143	3210	2780
1955	8497	5061	2410	2832	2026	2483
1938-1960 Aver.	10473	5058	2897	2466	3020	2794

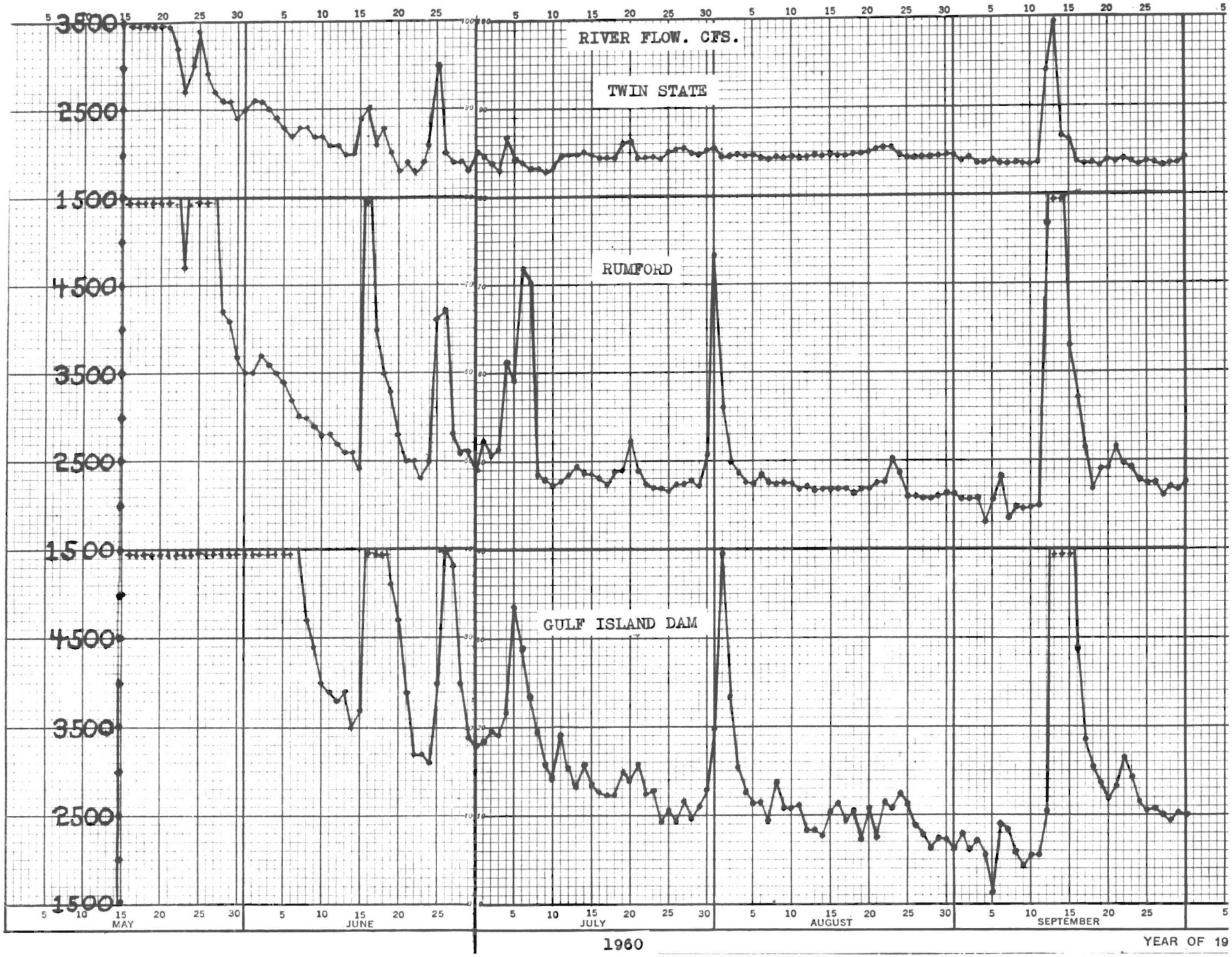

RIVER FLOW. CFS.
TWIN STATE
RUMFORD
GULF ISLAND DAM
3500
2500
1500
4500
3500
2500
1500
4500
3500
2500
1500
MAY
JUNE
JULY
AUGUST
SEPTEMBER
1960
YEAR OF 19

TABLE T#1

Water Temperatures (°C)

Gulf Island Dam
(Monthly Averages)

Year	May*	June	July	August	September
1960**	13.6	20.6	22.8	23.0	18.9
1959**	16.6	18.0	23.1	23.8	20.5
1958**	11.5	17.6	22.1	22.4	19.2
1957**	14.5	21.2	22.5	22.1	19.9
1956**	9.4	20.4	21.6	22.5	17.4
Eighteen Year Average	12.3	19.6	23.6	23.2	19.2
1960 Comparison with Average	⁄0.13	⁄1.0	-o.8	-o.2	-0.3

* Based on Thursday Reports

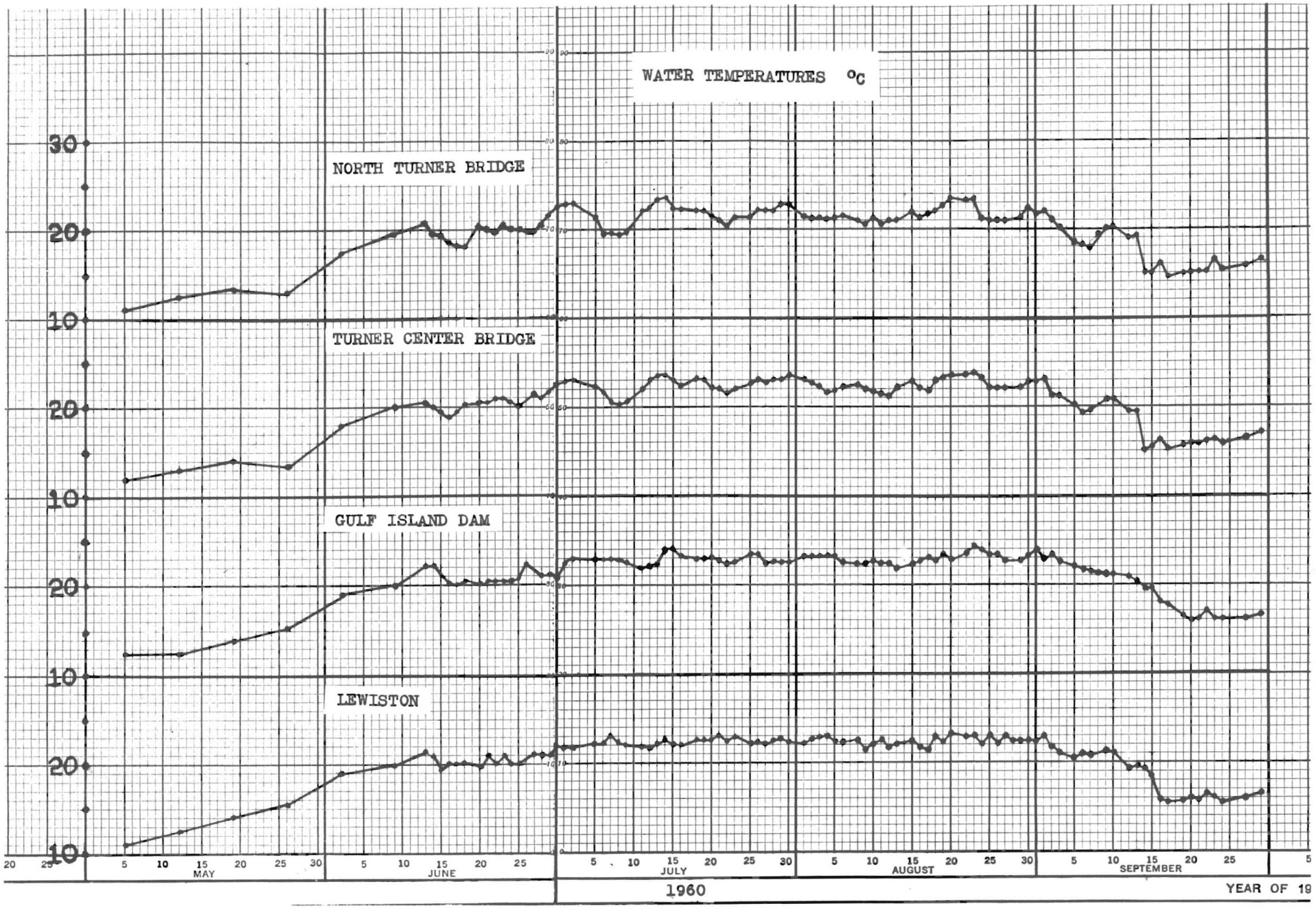
** June through September average of Daily Reports

TABLE T#2

Water Temperatures (°C)

Gulf Island Dam
Average Daily Temperature

Week Beginning	Temp. °C	Week Beginning	Temp. °C
June 13	21.0	August 1	23.1
20	20.4	8	22.3
27	21.6	15	22.8
		22	23.5
July 4	22.8	29	23.1
11	22.9		
18	22.7	Sept. 5	21.4
25	22.6	12	19.4
		19	16.2
		26	16.0


WATER TEMPERATURES °C
NORTH TURNER BRIDGE
TURNER CENTER BRIDGE
GULF ISLAND DAM
LEWISTON
30
20
10
20
10
20
10
20
10
20 25
5 10 15 20 25 30
MAY
5 10 15 20 25
JUNE
5 10 15 20 25 30
JULY
5 10 15 20 25 30
AUGUST
5 10 15 20 25
SEPTEMBER
5
1960
YEAR OF 19

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Lewiston 1960. For the first time since the river odor became a problem, there was no objectionable river odor in the downtown areas of Lewiston and Auburn and there was no general odor coverage. Much favorable comment has been made to the Administrator concerning the lack of odor and the marked contrast with many previous years.

Another encouraging feature has been the reduction in the appearance and intensity of the hydrogen sulphide at Gulf Island and Deer Rips Dams.

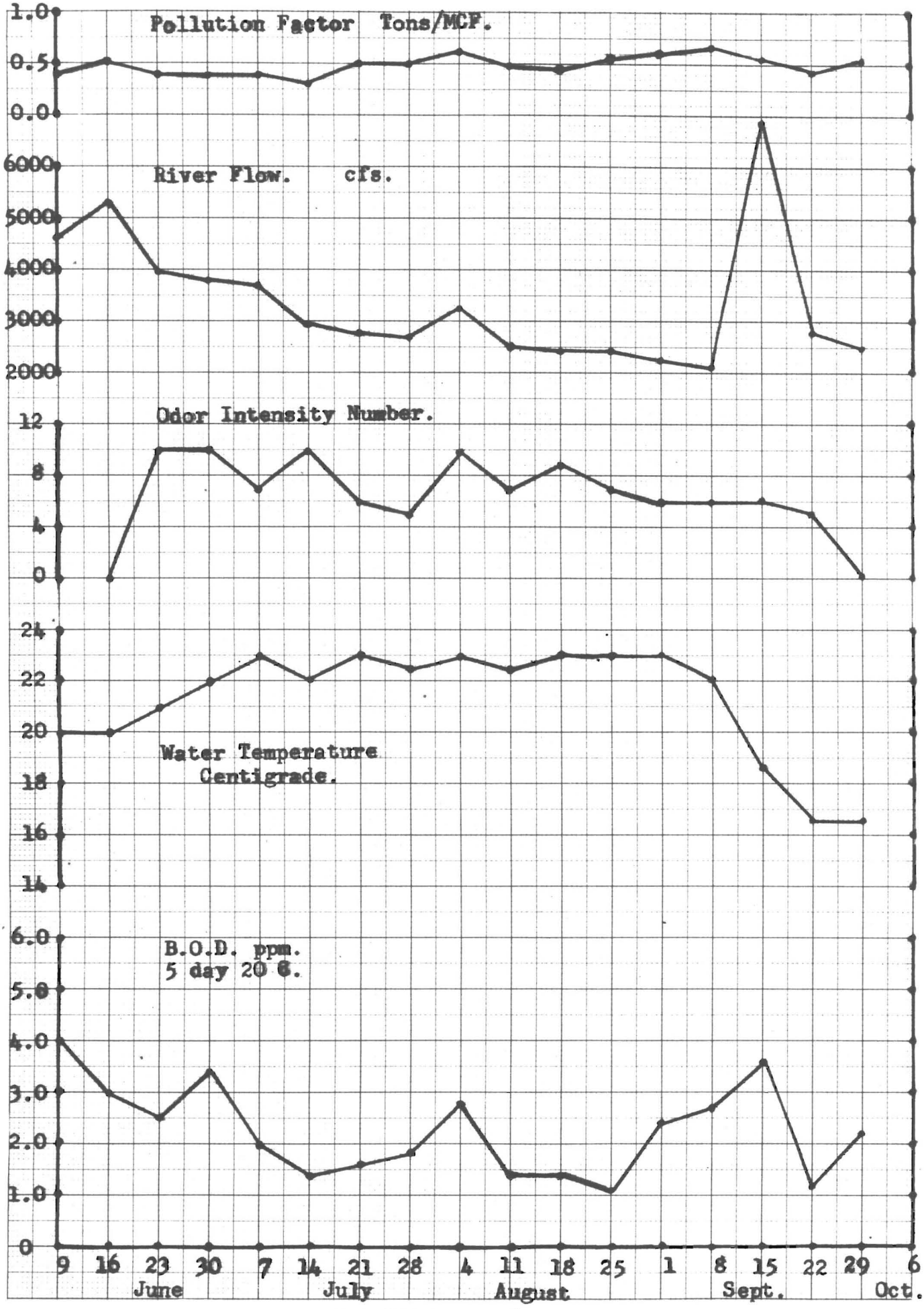
The Biological Oxygen Demands were comparatively low and the Dissolved Oxygen in the river water was somewhat higher. Methylene Blue stabilities usually were higher than any previous year.

TABLE #7

Lewiston Data 1960

Date**	Water Temp. °C	B.O.D. 5 day ppm	Odor Intens. Number	River* Flow C.F.S.	Compens.* Tons per M.C.F.
June 9	20.0	3.94	--	4610	0.43
16	20.0	2.96	0	5300	0.51
23	21.0	2.50	10	3983	0.41
30	22.0	3.43	10	3779	0.43
July 7	23.0	2.03	7	3739	0.41
14	22.1	1.37	10	2946	0.31
21	23.0	1.59	6	2800	0.50
28	22.5	1.84	5	2713	0.51
Aug. 4	23.0	2.77	10	3250	0.59
11	22.5	1.39	7	2511	0.48
18	23.0	1.36	9	2454	0.47
25	23.0	1.10	7	2483	0.52
Sept. 1	23.0	2.44	6	2216	0.58
8	22.0	2.66	6	2063	0.68
15	18.5	3.55	6	6963	0.54
22	16.5	1.15	5	2797	0.44
29	16.5	2.13	0	2490	0.51

* Gulf Island Data. Week ending Sunday
** Thursday.



LEWISTON. 1960

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